

**FINAL REPORT
BEAVER VALLEY PLANT
MONACA, PENNSYLVANIA**

RACCOON CREEK AREA

Prepared for
ARCO CHEMICAL COMPANY/BEAZER EAST, INC.

By
David S. Smallwood and Associates, Inc.

December 1, 1998

TABLE OF CONTENTS

| SECTION | PAGE |
|--------------------------------|------|
| 1.0 Introduction | 1 |
| 1.1 Purpose of Report | |
| 1.2 Approved Cleanup Plan | |
| 2.0 Attainment Demonstration | 3 |
| 3.0 Post-Remediation Care Plan | 4 |
| 4.0 References | 6 |
| 5.0 Signatures | 6 |
| Tables | |
| Figures | |
| Attachments | |

1.0 INTRODUCTION

1.1 PURPOSE OF REPORT

In a Consent Order and Agreement (CO&A), dated July 12, 1994, between the Pennsylvania Department of Environmental Resources [now the Pennsylvania Department of Environmental Protection (PADEP)] and ARCO Chemical Company (ACC), ACC agreed to investigate soil and groundwater at its Beaver Valley Plant located in Monaca, Pennsylvania (Plant), and to develop plans for the remediation of the Plant, as necessary. In compliance with the 1994 CO&A, ACC and Beazer East, Inc. (BEI), whose predecessor company (Koppers) was a former owner/operator of the Plant, conducted extensive soil and groundwater investigations, pilot testing and remedial evaluation studies of six discrete areas at the Plant determined to contain regulated substances in soil and groundwater. The map provided as Figure 1-1 shows the Plant and the six areas. The area that is the subject of this report is the Raccoon Creek Area.

In 1995, the Pennsylvania Land Recycling and Environmental Remediation Standards Act (Act 2) was enacted. Act 2 specifies the substantive and procedural requirements under Pennsylvania law for the remediation of facilities located within the Commonwealth of Pennsylvania. Act 2 provides that the person performing the remediation may select from among three cleanup standards established by Act 2 or a combination of such standards. In accordance with the September 4, 1997 Notice of Intent to Remediate, ACC and BEI proposed to remediate the Raccoon Creek Area of the Plant to achieve a combination of the statewide health standards and site-specific standard set forth in Act 2. Because the proposed remediation included the site-specific standard, ACC and BEI were required by Section 304 of Act 2 to obtain PADEP's approval of a remedial investigation report, risk assessment, and cleanup plan.

On October 20, 1997, PADEP, ACC, and BEI entered into a Consent Order and Agreement for the remediation of the Plant (1997 CO&A). In the 1997 CO&A, PADEP determined that the requirement for a remedial investigation report had been satisfied by the information previously submitted by ACC and BEI (See Paragraph M of the 1997 CO&A). On October 13, 1997, ACC and BEI designated the historical site characterization reports of Plant environmental conditions

as the Remedial Investigation Reports which the Department formally approved. (See Paragraph O of the 1997 CO&A.) Moreover, subject to PADEP's approval of a risk assessment, PADEP approved the remedy selected by ACC and BEI for the Raccoon Creek Area and determined that the remedy evaluation and selection requirements of Section 304 (j) of Act 2 had been met. (See Paragraph P and Appendix D of the 1997 CO&A.)

ACC and BEI submitted a Risk Assessment and Cleanup Plan (RA/CP) for the Raccoon Creek Area to PADEP on February 20, 1998. PADEP provided comments on the RA/CP in a letter dated May 19, 1998. These comments were addressed in revisions submitted by ACC/BEI dated June 23, and September 3, 1998. ACC/BEI submitted a proposal relating to wetlands issues on July 22, 1998. PADEP accepted the wetlands proposal in a letter dated September 15, 1998. PADEP approved the RA/CP for the Raccoon Creek Area in a letter dated October 9, 1998.

This Final Report documents the attainment of the site-specific standard for the Raccoon Creek Area as approved by PADEP in the RA/CP and which PADEP, ACC and BEI agreed upon in Appendix D of the 1997 CO&A. The Final Report also sets forth the elements of the post remediation care plan which also were contained in the approved RA/CP and Appendix D of the 1997 CO&A. Section 5 of this Final Report identifies the parties who qualify for Act 2 liability protection either because they participated in the remediation of the Raccoon Creek Area or they otherwise fall within the scope of Section 501 of Act 2.

1.2 APPROVED CLEANUP PLAN

The approved Cleanup Plan and Appendix D of the 1997 CO&A require ACC and BEI to implement the following actions:

- (1) Collect and analyze surface water samples from Raccoon Creek for twelve consecutive quarters commencing in July 1997. Transects C, D, and E shown in Figure 1-2 are the approved sampling transects. Attainment of the Act 2 cleanup standard for the Raccoon Creek Area is demonstrated if the benzene concentration in 90% of the samples

collected from transects C, D, and E is less than or equal to 5 ppb for four consecutive quarters, and no sample exceeds 10 ppb. Following the demonstration of attainment, quarterly sampling will be conducted only at Transect E for the remainder of the twelve quarters.

- (2) Visually inspect the Raccoon Creek Area to confirm that at least a 70% ground cover of permanent plant species is present, and where necessary, provide topsoil and hydro-seeding to increase the vegetative cover.

ACC and BEI also agreed not to abandon groundwater monitoring wells MW-120, MW-159, MW-160, MW-161, MW-162S, MW-163S, MW-164, MW-501S, MW-501D, and MW-502 without first discussing the proposed abandonment with PADEP. The locations of these wells is shown in Figure 1-2.

2.0 ATTAINMENT DEMONSTRATION

The requirements of the approved Cleanup Plan and Appendix D of the 1997 CO&A have been met.

Raccoon Creek was sampled along Transects C, D, and E at the locations and depths specified in the approved Cleanup Plan and Appendix D of the 1997 CO&A. The creek was sampled on July 23 and 24, and October 28 of 1997, and February 25 and May 21 of 1998. The four reports referenced in Table 4-1 (August and December 1997, April and June 1998) were submitted to PADEP and contain all of the relevant data from these four sampling events with backup QA/QC information.

Table 2-1 summarizes the benzene monitoring results for Raccoon Creek at Transects C, D, and E for the four sampling events. The benzene concentration in all 84 samples is less than 5 ppb. The arithmetic average benzene concentration was 0.34 ppb with a standard deviation of ± 0.51

ppb. The highest benzene concentration was 4 ppb. Thus, the established attainment criteria for Raccoon Creek monitoring have been achieved.

Attachment 1 is an aerial photograph showing the Raccoon Creek Area. The photograph was taken by Michael Baker Jr., Inc. on August 19, 1998 at an altitude which gives a scale of 1 inch = 400 feet in the photograph.

In Attachment 1, the Raccoon Creek Area is in the middle of the view. The NOVA Chemicals facility and Raccoon Creek are at the bottom center. The BASF facility and PA Route 18 are on the right. The Ohio River is on the left. The East Landfill Area is at the upper center.

Attachment 1 shows the vegetation which exists at the Raccoon Creek Area, and indicates that except for access roads, more than 70% of the site is vegetated. Attachment 1 also indicates no evidence of accelerated erosion or significant subsidence.

A walking inspection of the site was conducted by David S. Smallwood on September 24, 1998. This inspection confirmed the findings from the aerial photograph.

Consistent with the Department's September 17, 1998 approval of a July 22, 1998 proposal regarding the resolution of wetland issues at the Beaver Valley Plant, a contribution in the amount of \$100,000.00 has been made to the Penns Corner Conservancy Charitable Trust, as specified by the Department, for wetland mitigation activities.

3.0 POST REMEDIATION CARE PLAN

The elements of this Post Remediation Care Plan were developed to conform to the Raccoon Creek Area Cleanup Plan approved by PADEP, and the requirements of Appendix D of the 1997 CO&A. The Post Remediation Care Plan includes the following:

1. Annual visual inspection of the site will continue for a period of 5 years. Locations where accelerated erosion or significant subsidence is apparent will be re-graded and covered with topsoil. The re-contoured ground surface will then be hydro-seeded so as to maintain the vegetative cover.
2. A suitable soils management and worker protection plan will be implemented as necessary, consistent with the terms of the 1997 CO&A and any approvals by PADEP regarding the disposition of soils and other materials that may be encountered at the site in the future. All future construction activities at the site will be performed in compliance with applicable health and safety plans and other regulatory requirements including those administered by OSHA.
3. ACC will record on the deed for the property prior to transfer sufficient information to describe the environmental conditions of the Raccoon Creek Area, as required by Pennsylvania law.
4. Except for groundwater monitoring wells MW-120, MW-159, MW-160, MW-161, MW-162S, MW-163S, MW-164, MW-501S, MW-501D, and MW-502, all remaining groundwater monitoring wells will be closed consistent with PADEP's February 1996 Groundwater Monitoring Guidance Manual, Chapter 7 – Well Abandonment Procedures. Abandonment of groundwater monitoring wells listed above will not occur without prior discussion with PADEP.
5. Raccoon Creek will be sampled along Transect E at the locations and depths specified in the approved Cleanup Plan and Appendix D of the 1997 CO&A for eight additional quarters. Stream sampling has already been completed for the first two quarters. Samples from Transect E were collected on July 29 and October 27, 1998. In compliance with the approved Cleanup Plan and Appendix D of the 1997 CO&A, these samples are being analyzed for BTEXS compounds via EPA test method 524.2.

No other post remediation sampling is warranted or required.

4.0 REFERENCES

Table 4-1 presents a list of the previous investigation reports and documents which constitute the remedial investigation, risk assessment, and cleanup plan for the Raccoon Creek Area.

5.0 SIGNATORIES

The following entities either participated in the remediation, or are otherwise covered by the liability protection provisions of Act 2 for the Raccoon Creek Area.

FOR ARCO CHEMICAL COMPANY

FOR BEAZER EAST, INC.

Thomas J. Walsh
Manager Cost Engineering, Planning,
And Remediation Projects
ARCO Chemical Company

James Brennan
Vice President
Beazer East, Inc.

CORPORATE SEAL

CORPORATE SEAL

Other entities covered under Section 501 of Act 2 include: Lyondell Chemical Company and Atlantic Richfield Company.

ARCO Chemical Company was formerly a wholly owned subsidiary of Atlantic Richfield Company, and is currently a wholly owned subsidiary of Lyondell Chemical Company. ARCO Chemical Company's name will become Lyondell Chemical Worldwide, Inc. in January 1999.

TABLE 2-1

SUMMARY OF ANALYTICAL RESULTS FOR BENZENE
SURFACE WATER SAMPLES FROM RACCOON CREEK
JULY AND OCTOBER 1997 AND FEBRUARY AND MAY 1998

ALL BENZENE CONCENTRATIONS ARE IN PARTS PER BILLION (PPB)

| Transect | SAMPLE LOCATION | SAMPLE DEPTH | JULY 23 & 24, 1997 | OCTOBER 28, 1997 | FEB. 25, 1998 | MAY 21, 1998 |
|----------|-----------------------|--------------|--------------------|------------------|---------------|--------------|
| C | 30 Feet Off West Bank | Mid-Depth | 0.15 | 0.25 | <0.13 | 0.61 |
| C | 30 Feet Off West Bank | Bottom | 1.1 | 0.39 | <0.13 | 0.61 |
| C | Center | Surface | 0.15 | <0.13 | 0.34 | 0.20 |
| C | Center | Mid-Depth | <0.13 | <0.13 | 0.66 | <0.13 |
| C | Center | Bottom | 1.1 | <0.13 | 0.69 | 1.2 |
| C | 30 Feet Off East Bank | Mid-Depth | 0.13 | <0.13 | <0.13 | 1.7 |
| C | 30 Feet Off East Bank | Bottom | <0.13 | <0.13 | <0.13 | 4.0 |
| D | 30 Feet Off West Bank | Mid-Depth | 0.22 | <0.13 | <0.13 | 0.75 |
| D | 30 Feet Off West Bank | Bottom | 0.24 | <0.13 | <0.13 | 1.0 |
| D | Center | Surface | 0.18 | <0.13 | 0.56 | 0.25 |
| D | Center | Mid-Depth | 0.15 | <0.13 | 0.35 | 0.22 |
| D | Center | Bottom | 0.41 | 0.13 | 0.46 | 0.36 |
| D | 30 Feet Off East Bank | Mid-Depth | 0.13 | <0.13 | <0.13 | 0.50 |
| D | 30 Feet Off East Bank | Bottom | <0.13 | <0.13 | 0.22 | <0.13 |

TABLE 2-1

SUMMARY OF ANALYTICAL RESULTS FOR BENZENE
SURFACE WATER SAMPLES FROM RACCOON CREEK
JULY AND OCTOBER 1997 AND FEBRUARY AND MAY 1998

ALL BENZENE CONCENTRATIONS ARE IN PARTS PER BILLION (PPB)

| Transect | SAMPLE LOCATION | SAMPLE DEPTH | JULY 23 & 24, 1997 | OCTOBER 28, 1997 | FEB. 25, 1998 | MAY 21, 1998 |
|-----------------|----------------------------|-------------------------|-----------------------------------|-----------------------------|--------------------------|-------------------------|
| E | 30 Feet Off West Bank | Mid-Depth | 0.28 | <0.13 | <0.13 | 0.70 |
| E | 30 Feet Off West Bank | Bottom | 0.81 | <0.13 | <0.13 | 0.70 |
| E | Center | Surface | 0.24 | <0.13 | 0.38 | 0.70 |
| E | Center | Mid-Depth | 0.18 | <0.13 | 0.49 | 0.64 |
| E | Center | Bottom | 0.45 | <0.13 | 0.30 | 0.60 |
| E | 30 Feet Off East Bank | Mid-Depth | 0.16 | <0.13 | <0.13 | <0.13 |
| E | 30 Feet Off East Bank | Bottom | <0.13 | <0.13 | 0.14 | 0.22 |

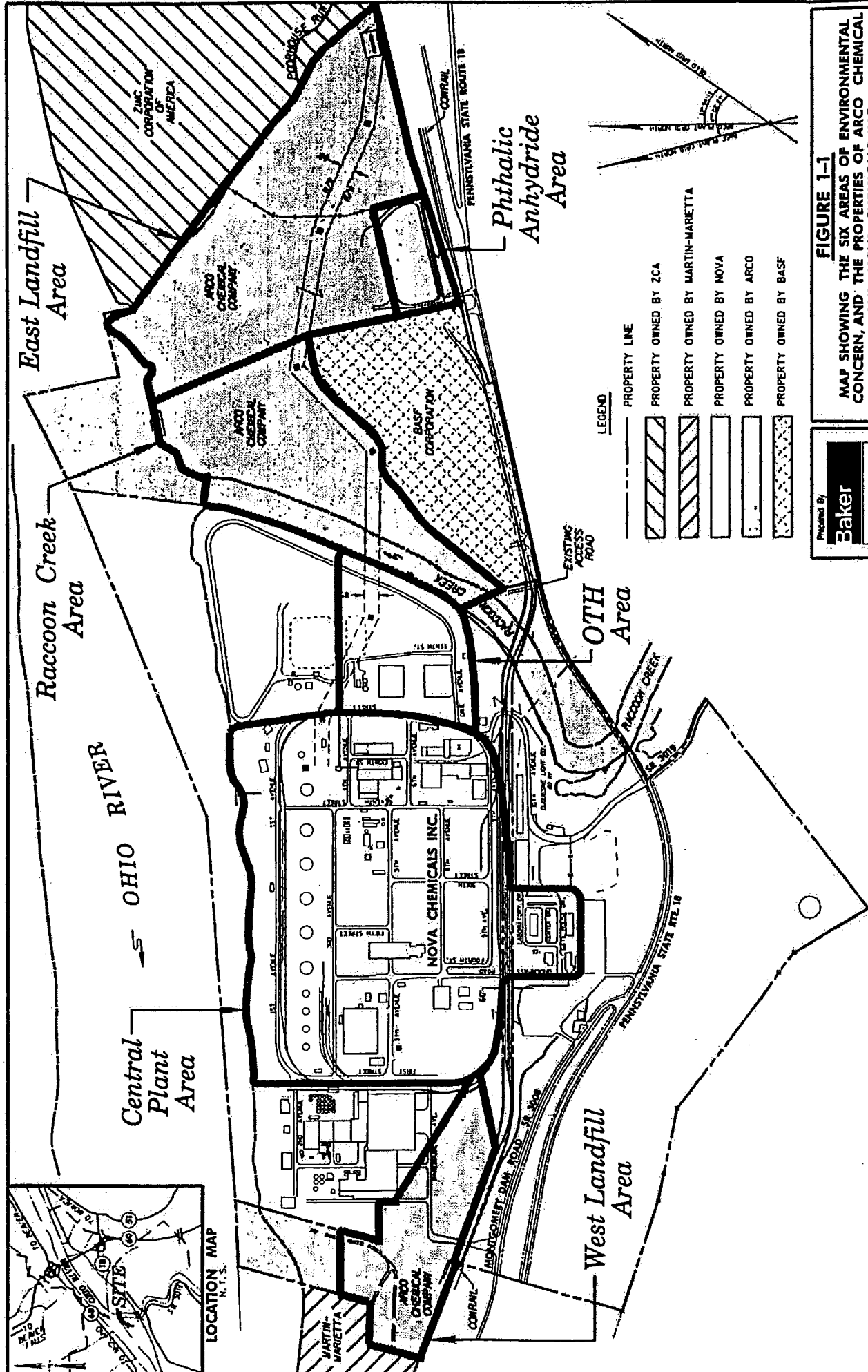
TABLE 4-1

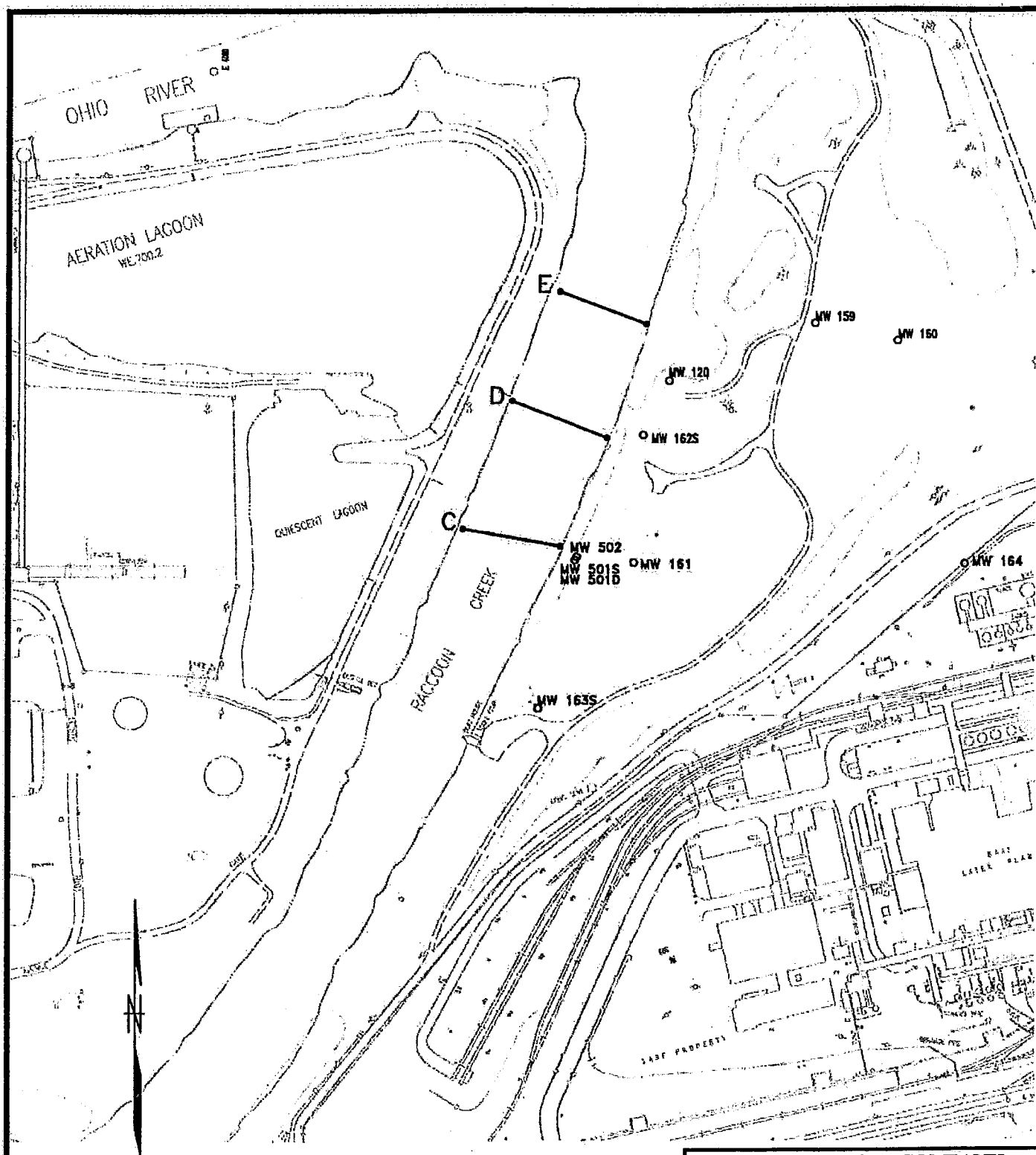
**LIST OF STUDIES AND DOCUMENTS WHICH COMPRISE THE REMEDIAL
INVESTIGATION, RISK ASSESSMENT, AND CLEANUP PLAN INFORMATION
FOR THE RACCOON CREEK AREA**

| STUDY OR DOCUMENT TITLE | PREPARED BY | DATE ISSUED |
|---|---|-------------------------|
| Remedial Investigation/Feasibility Study Raccoon Creek Area | Applied Hydrology Assoc., Inc. Denver, CO | February 1990 |
| Aquifer Test Results, Raccoon Creek Area | ERM-EnviroClean, Inc. | June 1992 |
| Estimated Inventory of Subsurface Organic Constituents | E.H. Dohnert Environmental Consulting Services Wilmington, DE | March 1994 |
| Raccoon Creek Investigation Report Findings | ICF Kaiser, Pittsburgh, PA | October 1996 |
| Groundwater Flow and Transport Evaluation Raccoon Creek Area | ICF Kaiser, Pittsburgh, PA | March 1997 (Revised) |
| Groundwater Modeling Evaluation of a Surface Recharge Barrier for Raccoon Creek Area | ICF Kaiser, Pittsburgh, PA | April 1997 |
| Beaver Valley Plant Chronological Summary of Remedy Selection Process | ACC/BEI | July 1997 |
| Analytical Results of Surface Water Samples Collected from Raccoon Creek July 23 & 23, 1997 | ICF Kaiser, Pittsburgh, PA | August 1997 |
| Analytical Results of Surface Water Samples Collected from Raccoon Creek October 28, 1997 | ICF Kaiser, Pittsburgh, PA | December 1997 |
| Analytical Results of Surface Water Samples Collected from Raccoon Creek February 25, 1998 | ICF Kaiser, Pittsburgh, PA | April 1998 |
| Analytical Results of Surface Water Samples Collected from Raccoon Creek May 21, 998 | ICF Kaiser, Pittsburgh, PA | June 1998 |

TABLE 4-1 (Continued)

| STUDY OR DOCUMENT TITLE | PREPARED BY | DATE ISSUED |
|---|--|--------------------|
| Analytical Results of Surface Water Samples Collected from Raccoon Creek July 29, 1998 | Applied Hydrology Assoc., Inc. Denver, CO | August 1998 |
| Risk Assessment and Cleanup Plan | ICF Kaiser, Pittsburgh, PA | February 1998 |
| PADEP Comments on RA/CP | Letter from John Matviya to Thomas Walsh | May 1998 |
| RA/CP Revisions | ICF Kaiser, Pittsburgh, PA | June 1998 |
| Proposed Resolution of Wetlands Issues Relating to WL/Q and RC Areas | Letter from Thomas Walsh to Charles Duritsa | July 1998 |
| Acceptance of Wetlands Proposal | Letter from John Matviya to Thomas Walsh | September 1998 |
| Professional Geologist's Seal | Letter from Thomas Walsh to Charles Duritsa (PADEP) | September 1998 |
| RA/CP Approval | Letter from John Matviya to Thomas Walsh | October 1998 |
| Wetland Mitigation Contribution | Letter from Thomas Walsh to Charles Duritsa | November 1998 |





**Applied
Hydrology
Associates, Inc.**



**ARCO CHEMICAL COMPANY
BEAVER VALLEY PROPERTY
RACCOON CREEK QUARTERLY MONITORING**

**FIGURE 1-2
TRANSECT AND
MONITORING WELL
LOCATIONS**

| | | |
|------------|------------------------|------------------|
| DESIGN: SM | DATE: 8/27/98 | FILE REFERENCED: |
| DRAWN: MJZ | PROJECT: TRAN-WELL.ecr | TRANSECT.DWG |
| CHECKED: | APPROVED: | PROJECT NO. 38-5 |
| | | PAGE NO. |

ARCO

8/19/98

1"=400'

1-6





Pennsylvania Department of Environmental Protection

400 Waterfront Drive
Pittsburgh, PA 15222-4745
March 15, 1999

Southwest Regional Office

412-442-4000
Fax 412-442-4194

Mr. Thomas J. Walsh
Manager, Cost Engineering, Planning
and Remediation Projects
Lyondell Chemical Company
3801 West Chester Pike
Newtown Square, PA 19073

Re: Environmental Cleanup Program
Arco Chemical Company/Beazer East, Inc.
Raccoon Creek Area Final Report
LRP 5-4-947-277
Beaver Valley Plant
Potter Township
Beaver County

Dear Mr. Walsh:

The Department reviewed the December 1, 1998 Final Report and the February 25, 1999 revisions for the Raccoon Creek area prepared on your behalf by David F. Smallwood & Associates, Inc. received in this office on December 17, 1998 and February 25, 1999, respectively. The Final Report pertaining to the Raccoon Creek area is approved by the Department in accordance with the provisions of the Land Recycling and Environmental Remediation Standards Act (Act 2). This site is, therefore, accorded the liability protection of Act 2, subject to the reopeners in Section 505 as set forth in Chapter 5.

The Final Report documented the attainment of the Site Specific Standard for the Raccoon Creek area as approved in the RA/CP and Appendix D of the Consent Order and Agreement of the October 20, 1997 Consent Order and Agreement. A post remediation care plan is approved as a part of this Final Report and must be implemented fully to maintain liability protection. The property may be subject to the deed acknowledgement requirements of the Act of July 7, 1980 (TL380, No. 97) (Solid Waste Management Act) or the Act of October 18, 1998 (P.L. 356, No. 108) (Hazardous Sites Cleanup Act).

Sincerely,

John J. Matviya
Regional Manager
Environmental Cleanup

